

PART 1 GENERAL

1.1 DESCRIPTION

A. Section Includes

1. Multi-parameter universal controllers as part of a process monitoring system that includes display terminals, and associated modules that control, indicate, record, and transmit signals from multiple online sensors in water resource recovery facilities.

B. Scope

1. Furnish, install, configure, and place into satisfactory operation multi-parameter terminal /controllers as shown on the Drawings and specified herein.
2. The Drawings and Specifications illustrate and specify functional and general construction requirements of universal controllers and associated networks but do not necessarily show or specify all components, wiring, piping, and accessories required to make a completely integrated system. Provide all components, piping, wiring, accessories, and labor required for a complete and integrated process monitoring and control network.

- #### C. Coordination: Coordinate with other suppliers for installation of all items specified herein and required to ensure the complete and proper interfacing of all process monitoring and control network components and systems.

1.2 SYSTEM DESCRIPTION

A. Design Requirements

1. Design universal controller system for continuous operation outdoors.
2. Universal controller system components shall be designed to be part of a system that has the following capabilities and features:
 - a. Enhanced protection against overvoltage due to lightning and power supply fluctuations according to EN61326 when installed using manufacturer's recommended components per manufacturer's instructions.

- #### B. Powered from a centralized power supply. 24VDC loop powered communication.

C. Performance Requirements

1. Operating range
 - a. Temperature: -4°F to 131°F (-20°C to 55°C)
 - b. Relative humidity: less than or equal to 90% (yearly average)
 - c. Altitude: less than or equal to 6,562 ft. (2,000 m) above mean sea level

1.3 QUALITY ASSURANCE

A. Acceptable Manufacturers:

1. Furnish universal controllers by the named manufacturers.
2. The named manufacturers have been specified to establish the standard of quality and performance of the equipment to be supplied.
3. Manufacturer shall be ISO 9001 certified.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

- #### A. Terminal/controllers shall not be delivered to the site until all product information and system shop drawings have been approved.

- B. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- C. Storage and Handling Requirements:
 - 1. Store and handle materials in accordance with manufacturer's instructions.
 - 2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
 - 3. Store materials in clean, dry area indoors.
 - 4. Protect materials during storage, handling, and installation to prevent damage.
 - 5. Temperature range for storage: -13°F to 149°F (-25°C to 65°C)

1.5 SUBMITTALS

- A. Product data
 - 1. Operating manual for universal controller and associated modules.
 - 2. Mounting bracket installation instructions.
- B. Manufacturer's Certifications: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
- C. Warranty documentation: Submit manufacturer's standard warranties.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Provide products from the following manufacturer:
 - 1. YSI Incorporated, 1700/1725 Brannum Lane, Yellow Springs, OH 45387. 1-800-765-4974.

2.2 MANUFACTURED UNIT

Note to specifier: Choose DIQ/S 282 and/or DIQ/S 284 for 2 and 4 sensor connections, respectively. Analog options are shown below. Consult YSI for digital fieldbus connection options including Modbus, Profibus, Ethernet/IP, Modbus TCP/IP, and Profinet.

- A. The multi-parameter controller consists of the following:
 - 1. Model DIQ/S 282-CR3 2-channel universal controller.
 - a. Inputs
 - 1) 1 SensorNet connection
 - 2) 1 x 100 to 240 VAC power
 - b. Outputs
 - 1) 3 current outputs
 - 2) 3 relay outputs
 - c. Display
 - 1) Color, backlit.
 - 2) Resolution: 320 (W) x 240 (H) pixels
 - 3) Viewable area: 2.76 in. (W) x 2.07 in. (H)
 - 4) Up to 10 measured values depending on the connected sensors.
 - 5) Instantaneous and continuous display of up to 10 measured values depending on the connected sensors.
 - 6) Graphical display with extended sensor functions of select sensors.

- d. Function/operation
 - 1) 3 function keys
 - 2) 2 confirmation/switching keys
 - 3) 2-directional navigation key
 - e. Datalogger
 - 1) Total storage: Up to 520,000 measurements in csv format.
 - 2) User programmable logging interval: 1 minute to 60 minutes.
 - 3) For each measurement logged, display of logged measurements at selected logging interval in a list or graphical daily, weekly or monthly xy chart.
 - f. Multi-function USB-A port
 - 1) Electronic key
 - 2) Firmware upgrade
 - 3) Data transfer
 - g. Cable glands: M 16 x 1.5, 4 total, with blind plug
 - h. Power output: 6.5W
 - i. Controller shall use a menu-driven operating system.
 - j. Each universal controller shall control 1 to 2 sensors.
1. Model DIQ/S 284-CR6 4-channel universal controller.
- a. Inputs
 - 1) 3 SensorNet connections
 - 2) 1 x 100 to 240 VAC power
 - b. Outputs
 - 1) 6 current outputs
 - 2) 6 relay outputs
 - c. Display
 - 1) Color, backlit
 - 2) Resolution: 320 (W) x 240 (H) pixels
 - 3) Viewable area: 2.76 in. (W) x 2.07 in. (H)
 - 4) Up to 10 measured values depending on the connected sensors.
 - 5) Instantaneous and continuous display of up to 20 measured values depending on the connected sensors.
 - 6) Graphical display with extended sensor functions of select sensors.
 - d. Function/operation
 - 1) 3 function keys
 - 2) 2 confirmation/switching keys
 - 3) 2-directional navigation key
 - e. Datalogger
 - 1) Total storage: Up to 520,000 measurements in csv format.
 - 2) User programmable logging interval: 1 minute to 60 minutes.
 - 3) For each measurement logged, display of logged measurements at selected logging interval in a list or graphical daily, weekly or monthly xy chart.
 - f. Multi-function USB-A port
 - 1) Electronic key
 - 2) Firmware upgrade

- g. Data transfer Cable glands: M 16 x 1.5, 4 total, with blind plug
- h. Power output: 6.5W
- i. Controller shall use a menu-driven operating system.
- j. Each universal controller shall control 1 to 4 sensors.

Note to specifier: Specify DIQ/JB to add one additional sensor connection.

- 2. Model DIQ/JB expansion module
 - a. 7 passive terminal strips
 - b. Cable glands: M 16 x 1.5, 4 total, with screw plug
- 3. SNCIQ sensor cable.
 - a. 3-conductor shielded cable: communications, power, shield
 - b. Conductors: Minimum 18 AWG
 - c. Power supply: low voltage (24 V)
 - d. Cable shall be interchangeable with any and all sensors in the monitoring system.

Note to specifier: Specify or note on drawings appropriate length of cable in meters and/or specify cable reels in standard lengths of 250 m, 500 m, and 1,000 m, e.g. SNCIQ-250 is 250 m cable reel.

2.3 MATERIALS

- A. Terminal/controller.
 - 1. Housing material: polycarbonate, 20% glass filled
 - 2. Function keys: silicon
 - 3. Certification: ETL, cETL (conforms with relevant UL and Canadian standards), CE
 - 4. EMI/RFI conformance
 - a. EN 61326 Class B
 - b. FCC Class A
 - 5. Safety
 - a. EN 61010-1
 - b. UL 61010-1
 - c. CAN/CSA C22.2#61010-1
 - 6. Protection rating: IP67
 - 7. 3-year warranty
- B. Expansion module
 - 1. Housing material: polycarbonate, 20% glass filled
 - 2. EMI/RFI conformance
 - a. EN 61326 Class B
 - b. FCC Class A
 - 3. Safety
 - a. EN 61010-1
 - b. UL 61010-1
 - c. CAN/CSA C22.2#61010-1
 - 4. 3-year warranty

- C. SNCIQ sensor cable.
 - 1. Conductors: copper
 - 2. Cable sheath: PUR
 - 3. Protection rating: IP68 (waterproof)
 - 4. Warranty: 12 months

2.4 ACCESSORIES

- A. Sun shield:
 - 1. YSI model 109 295Y sun shield

PART 3 EXECUTION

3.2 INSTALLATION

- A. Install universal controllers and expansion modules in strict accordance with the manufacturer's instructions and recommendations.
- B. Network cable
 - 1. Bend radius
 - a. Permanent bend: not less than 3.2 in. (80 mm).
 - b. One-time bend: not less than 2 in. (50 mm).

3.3 DEMONSTRATION AND TRAINING

- A. Manufacturer's representative will include a half-day of training, if requested, for the process monitoring system inclusive of the equipment supplied in this section and Section 40 95 23 Process Monitoring System expansion Modules and sections specifying primary process measurement devices.
 - 1. Contractor will schedule a date and time for start-up.
 - 2. Contractor will require representatives of the following be present during the start-up:
 - a. General contractor
 - b. Electrical contractor
 - c. YSI factory-trained representative
 - d. Owner's personnel
 - e. Engineer

END OF SECTION